

#6

1638



ENTERED

RECEIVED

25 2002

1600

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/719,024

DATE: 04/16/2002

TIME: 14:37:02

Input Set : A:\2272704080.ST25.txt

Output Set: N:\CRF3\04162002\I719024.raw

3 <110> APPLICANT: Bisaro, David M.  
 5 <120> TITLE OF INVENTION: Mutant Forms of the AL2 Gene of Geminiviruses  
 7 <130> FILE REFERENCE: 22727/04080  
 9 <140> CURRENT APPLICATION NUMBER: 09/719,024  
 10 <141> CURRENT FILING DATE: 2000-12-05  
 12 <150> PRIOR APPLICATION NUMBER: PCT/US99/12680  
 13 <151> PRIOR FILING DATE: 1999-06-04  
 15 <160> NUMBER OF SEQ ID NOS: 75  
 17 <170> SOFTWARE: PatentIn version 3.1  
 19 <210> SEQ ID NO: 1  
 20 <211> LENGTH: 129  
 21 <212> TYPE: PRT  
 22 <213> ORGANISM: Tomato golden mosaic virus  
 24 <400> SEQUENCE: 1  
 26 Met Arg Asn Ser Ser Ser Ser Thr Pro Pro Ser Ile Lys Ala Gln His  
 27 1 5 10 15  
 30 Arg Ala Ala Lys Arg Arg Ala Ile Arg Arg Arg Arg Ile Asp Leu Asn  
 31 20 25 30  
 34 Cys Gly Cys Ser Ile Tyr Ile His Ile Asp Cys Arg Asn Asn Gly Phe  
 35 35 40 45  
 38 Thr His Arg Gly Thr Tyr His Cys Ala Ser Ser Arg Glu Trp Arg Leu  
 39 50 55 60  
 42 Tyr Leu Gly Ile Asn Lys Ser Pro Leu Phe Gln Asp Asn Gln Arg Arg  
 43 65 70 75 80  
 46 Gly Ser Pro Leu His Gln His Gln Asp Ile Pro Leu Thr Asn Gln Val  
 47 85 90 95  
 50 Gln Pro Gln Pro Glu Glu Ser Ile Gly Ser Pro Gln Gly Ile Ser Gln  
 51 100 105 110  
 54 Leu Pro Ser Met Asp Asp Ile Asp Asp Ser Phe Trp Glu Asn Leu Phe  
 55 115 120 125  
 58 Lys  
 62 <210> SEQ ID NO: 2  
 63 <211> LENGTH: 129  
 64 <212> TYPE: PRT  
 65 <213> ORGANISM: Abutilon mosaic virus  
 67 <400> SEQUENCE: 2  
 69 Met Arg Ser Ser Ser Pro Ser His Pro Pro Ser Ile Lys Lys Ala His  
 70 1 5 10 15  
 73 Arg Gln Ala Lys Arg Arg Ala Ile Arg Arg Arg Arg Ile Asp Leu Gln  
 74 20 25 30  
 77 Cys Gly Cys Ser Ile Tyr Phe His Ile Asp Cys Thr Gly His Gly Phe  
 78 35 40 45  
 81 Thr His Arg Gly Thr His His Cys Thr Ser Gly Gly Glu Trp Arg Val

TECH CENTER 1600/2900

APR 2 5 2002

RECEIVED

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/719,024

DATE: 04/16/2002

TIME: 14:37:02

Input Set : A:\2272704080.ST25.txt

Output Set: N:\CRF3\04162002\I719024.raw

```

82      50      55      60
85 Tyr Leu Gly Asp Lys Lys Ser Pro Val Phe Gln Asp Val Gln Ser Arg
86 65      70      75      80
89 Arg Thr Ile Ile His Gln Asn Glu Asn Ile Pro Cys Thr Asn Thr Val
90      85      90      95
93 Gln Pro Gln Pro Glu Glu Ser Val Ala Ser Pro Gln Ser Leu Pro Glu
94      100      105      110
97 Leu Pro Ser Leu Asp Asp Ile Asp Glu Ser Phe Trp Val Asn Leu Phe
98      115      120      125
101 Ser
105 <210> SEQ ID NO: 3
106 <211> LENGTH: 129
107 <212> TYPE: PRT
108 <213> ORGANISM: Abutilon mosaic virus
110 <400> SEQUENCE: 3
112 Met Arg Ser Ser Ser Pro Ser Gln Pro Pro Ser Ile Lys Lys Ala His
113 1      5      10      15
116 Arg Gln Ala Lys Arg Arg Ala Ile Arg Arg Arg Arg Ile Asp Leu Gln
117      20      25      30
120 Cys Gly Cys Ser Ile Tyr Phe His Ile Asp Cys Thr Gly His Gly Phe
121      35      40      45
124 Thr His Arg Gly Ile His His Cys Thr Ser Gly Gly Glu Trp Arg Val
125      50      55      60
128 Tyr Leu Gly Asp Ser Lys Ser Pro Val Phe Gln Asp Ile Gln Ser Arg
129 65      70      75      80
132 Gly Pro Ala Ile His Gln Asn Glu Asp Ile Pro Cys Thr Asn Thr Val
133      85      90      95
136 Gln Pro Gln Pro Glu Glu Ser Val Ala Ser Pro Gln Ser Leu Pro Glu
137      100      105      110
140 Leu Pro Ser Leu Asp Asp Phe Asp Asp Ser Phe Trp Val Asn Leu Phe
141      115      120      125
144 Lys
148 <210> SEQ ID NO: 4
149 <211> LENGTH: 129
150 <212> TYPE: PRT
151 <213> ORGANISM: Bean dwarf mosaic virus
153 <400> SEQUENCE: 4
155 Met Gln Ser Ser Ser Leu Ser Thr Pro Pro Ser Ile Lys Lys Ala His
156 1      5      10      15
159 Arg Gln Ala Lys Arg Arg Ala Ile Arg Arg Arg Arg Ile Asp Leu Glu
160      20      25      30
163 Cys Gly Cys Ser Ile Tyr Thr His Ile Gly Cys Thr Gly His Gly Phe
164      35      40      45
167 Thr His Arg Gly Ala His His Cys Thr Ser Ser Arg Glu Trp Arg Val
168      50      55      60
171 Tyr Leu Gly Asp Arg Lys Ser Pro Leu Phe Gln Asp Ile Gln Ser Arg
172 65      70      75      80
175 Gly Thr Val Val His Gln Gln Gln Gly Ile Gln Arg Thr Asp Thr Val
176      85      90      95

```

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/719,024

DATE: 04/16/2002

TIME: 14:37:02

Input Set : A:\2272704080.ST25.txt

Output Set: N:\CRF3\04162002\I719024.raw

179 Gln Pro Gln Pro Glu Glu Ser Val Ala Ser Pro Gln Ser Leu Pro Glu  
 180 100 105 110  
 183 Leu Pro Ser Leu Asp Asp Ile Asp Asp Ser Phe Trp Val Asp Leu Phe  
 184 115 120 125

187 Lys

191 &lt;210&gt; SEQ ID NO: 5

192 &lt;211&gt; LENGTH: 129

193 &lt;212&gt; TYPE: PRT

194 &lt;213&gt; ORGANISM: Bean dwarf mosaic virus

196 &lt;400&gt; SEQUENCE: 5

198 Met Arg Ser Ser Ser Pro Ser Gln Pro Pro Ser Ile Lys Ala Gln His  
 199 1 5 10 15

202 Arg Ile Ala Lys Arg Lys Ala Ile Arg Arg Arg Arg Ile Asp Leu Asn  
 203 20 25 30

206 Cys Gly Cys Ser Ile Phe Tyr His Ile Lys Cys Ala Asp His Gly Phe  
 207 35 40 45

210 Thr His Arg Gly Glu His His Cys Ala Ser Gly Arg Glu Phe Arg Phe  
 211 50 55 60

214 Tyr Leu Gly Gly Thr Lys Ser Pro Leu Phe Gln Asp His Ala Gly Gly  
 215 65 70 75 80

218 Arg Ser Ser Ile His Thr Asp Lys Asp Ile Pro His Pro Ser Gln Val  
 219 85 90 95

222 Gln Ser Gln Pro Gln Glu Ser Thr Gly Ser Pro Gln Ser Ile Pro Glu  
 223 100 105 110

226 Leu Pro Ser Leu Asp Asp Ile Asp Ser Ser Phe Trp Asp Asp Ile Phe  
 227 115 120 125

230 Lys

234 &lt;210&gt; SEQ ID NO: 6

235 &lt;211&gt; LENGTH: 129

236 &lt;212&gt; TYPE: PRT

237 &lt;213&gt; ORGANISM: Bean dwarf mosaic virus

239 &lt;400&gt; SEQUENCE: 6

241 Met Arg Ser Ser Ser Pro Ser Gln Pro Pro Ser Ile Lys Ala Gln His  
 242 1 5 10 15

245 Arg Ile Ala Lys Arg Arg Ala Ile Arg Arg Arg Arg Ile Asp Leu Asn  
 246 20 25 30

249 Cys Gly Cys Ser Ile Phe Tyr His Ile Lys Cys Ala Asp His Gly Phe  
 250 35 40 45

253 Thr His Arg Gly Glu His His Cys Ala Ser Gly Arg Glu Phe Arg Phe  
 254 50 55 60

257 Tyr Leu Gly Gly Thr Lys Ser Pro Leu Phe Gln Asp Asn Ala Gly Gly  
 258 65 70 75 80

261 Arg Ser Ser Ile His Thr Asp Lys Asp Ile Pro His Pro Asn Gln Val  
 262 85 90 95

265 Gln Ser Gln Pro Gln Glu Ser Thr Gly Ser Pro Gln Ser Ile Pro Glu  
 266 100 105 110

269 Leu Pro Ser Leu Asp Asp Ile Asp Ser Ser Phe Trp Asp Asp Ile Phe  
 270 115 120 125

273 Lys

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/719,024

DATE: 04/16/2002

TIME: 14:37:02

Input Set : A:\2272704080.ST25.txt

Output Set: N:\CRF3\04162002\I719024.raw

```

277 <210> SEQ ID NO: 7
278 <211> LENGTH: 129
279 <212> TYPE: PRT
280 <213> ORGANISM: Bean dwarf mosaic virus
282 <400> SEQUENCE: 7
284 Met Arg Ser Ser Ser Pro Ser Gln Pro Pro Ser Ile Lys Ala Gln His
285 1 5 10 15
288 Arg Ile Ala Lys His Lys Ala Ile Arg Arg Arg Arg Ile Asp Leu Asn
289 20 25 30
292 Cys Gly Cys Ser Ile Phe Tyr His Ile Lys Cys Ala Asp His Gly Phe
293 35 40 45
296 Thr His Arg Gly Glu His His Cys Ala Ser Gly Arg Glu Phe Arg Phe
297 50 55 60
300 Tyr Leu Gly Gly Thr Lys Ser Pro Leu Phe Gln Asp His Ala Gly Gly
301 65 70 75 80
304 Arg Ser Ser Ile His Thr Asp Lys Asp Ile Pro His Pro Ser Gln Val
305 85 90 95
308 Gln Ser Gln Pro Gln Glu Ser Thr Gly Ser Pro Gln Ser Ile Pro Glu
309 100 105 110
312 Leu Pro Ser Leu Asp Asp Ile Asp Ser Ser Phe Trp Asp Asp Ile Phe
313 115 120 125
316 Lys
320 <210> SEQ ID NO: 8
321 <211> LENGTH: 129
322 <212> TYPE: PRT
323 <213> ORGANISM: cabbage leaf curl virus
325 <400> SEQUENCE: 8
327 Met Gln Asn Ser Ser Leu Leu Lys Pro Pro Ser Ile Lys Ala Gln His
328 1 5 10 15
331 Lys Ile Ala Lys Arg Arg Ala Val Arg Arg Arg Arg Ile Asp Leu Asn
332 20 25 30
335 Cys Gly Cys Ser Ile Phe Leu His Ile Asn Cys Ala Asp Asn Gly Phe
336 35 40 45
339 Thr His Arg Gly Glu His His Cys Ser Ser Gly Arg Glu Phe Arg Phe
340 50 55 60
343 Tyr Leu Gly Gly Ser Lys Ser Pro Ile Phe Gln Asp Thr Thr Arg Arg
344 65 70 75 80
347 Gly Pro Val Val His Gln Asn Gln Asp Leu Pro His Pro Ser Pro Val
348 85 90 95
351 Gln Pro Gln Pro Thr Glu Ser Ile Gly Ser Pro Gln Ser Leu Leu Gln
352 100 105 110
355 Leu Pro Ser Leu Asp Asp Phe Asp Glu Ser Phe Trp Ala Asp Ile Phe
356 115 120 125
359 Lys
363 <210> SEQ ID NO: 9
364 <211> LENGTH: 129
365 <212> TYPE: PRT
366 <213> ORGANISM: Potato yellow mosaic virus
368 <400> SEQUENCE: 9

```

## RAW SEQUENCE LISTING

PATENT APPLICATION: US/09/719,024

DATE: 04/16/2002

TIME: 14:37:02

Input Set : A:\2272704080.ST25.txt

Output Set: N:\CRF3\04162002\I719024.raw

```

370 Met Arg Ser Ser Ser Pro Ser Gln Pro Pro Ser Ile Lys Lys Ala His
371 1          5          10          15
374 Arg Gln Ala Lys Lys Arg Ala Ile Arg Arg Arg Ile Asp Leu Asp
375          20          25          30
378 Cys Gly Cys Ser Ile Tyr Phe His Ile Asp Cys Ala Gly His Gly Phe
379          35          40          45
382 Thr His Arg Gly Ala His His Cys Thr Ser Gly Arg Glu Trp Arg Val
383          50          55          60
386 Tyr Leu Gly Asp Arg Lys Ser Pro Leu Phe Gln Asp Lys Pro Ser Arg
387 65          70          75          80
390 Gly His Ala Ile His Gln Asp Gln Asp Ile Gln Arg Pro Asn Pro Val
391          85          90          95
394 Gln Pro Gln Pro Gln Glu Ser Ile Gly Ser Pro Gln Ser Ile Pro Glu
395          100         105         110
398 Leu Pro Ser Leu Asp Asp Ile Asp Asp Ser Phe Trp Val Glu Leu Phe
399          115         120         125

```

402 Ser

406 &lt;210&gt; SEQ ID NO: 10

407 &lt;211&gt; LENGTH: 129

408 &lt;212&gt; TYPE: PRT

409 &lt;213&gt; ORGANISM: Sida golden mosaic geminivirus

411 &lt;400&gt; SEQUENCE: 10

```

413 Met Arg Ser Ser Ser Pro Ser Thr Pro Pro Ser Ile Lys Lys Thr His
414 1          5          10          15
417 Arg Gln Ala Lys Lys Arg Ser Val Arg Arg Arg Arg Ile Asp Leu Glu
418          20          25          30
421 Cys Gly Cys Ser Ile Tyr Phe His Ile Gly Cys Thr Gly His Gly Phe
422          35          40          45
425 Thr His Arg Gly Thr His His Cys Thr Ser Phe Arg Glu Trp Arg Leu
426          50          55          60
429 Tyr Leu Gly Asp Arg Lys Ser Pro Leu Phe Gln Asp Ile Gln Gly Arg
430 65          70          75          80
433 Gly Ser Thr Val His Glu His Gln Asp Ile Gln Tyr Pro Asn Phe Val
434          85          90          95
437 Gln Pro Gln Pro Glu Glu Ser Val Ala Ser Pro Gln Ser Val Pro Glu
438          100         105         110
441 Leu Pro Ser Leu Asp Asp Ile Pro Asp Ser Phe Trp Val Asp Leu Phe
442          115         120         125

```

445 Lys

449 &lt;210&gt; SEQ ID NO: 11

450 &lt;211&gt; LENGTH: 131

451 &lt;212&gt; TYPE: PRT

452 &lt;213&gt; ORGANISM: Squash leaf curl virus

454 &lt;400&gt; SEQUENCE: 11

```

456 Met Pro Asn Ser Ser Ser Ser Lys Val Pro Ser Ile Lys Ala Gln His
457 1          5          10          15
460 Arg Ile Ala Lys Lys Arg Ala Val Arg Arg Arg Arg Ile Asp Leu Asp
461          20          25          30
464 Cys Gly Cys Ser Ile Tyr Ile His Ile Asn Cys Ala Lys Asp Gly Asn

```

VERIFICATION SUMMARY

PATENT APPLICATION: US/09/719,024

DATE: 04/16/2002

TIME: 14:37:03

Input Set : A:\2272704080.ST25.txt

Output Set: N:\CRF3\04162002\I719024.raw